

California Energy Commission

Committee Workshop on California- Mexico Border Energy Issues

May 18, 2005



Energy Supply and Demand



Summary of Electricity Supply and Demand

- San Diego's electricity demand growth is driven by residential population increases, resulting in 2-3 percent annual increases.
- Annual electricity demand growth has exceeded six percent in Baja California for the last five years and will continue at this rate for 5-10 years in the future.
- To meet the growing demand for electricity (and natural gas), the energy sectors of both California and Baja California are becoming increasingly integrated.
- No electricity capacity shortfall anticipated on either side of the border through 2012.

San Diego/Imperial County Energy Supply and Capacity

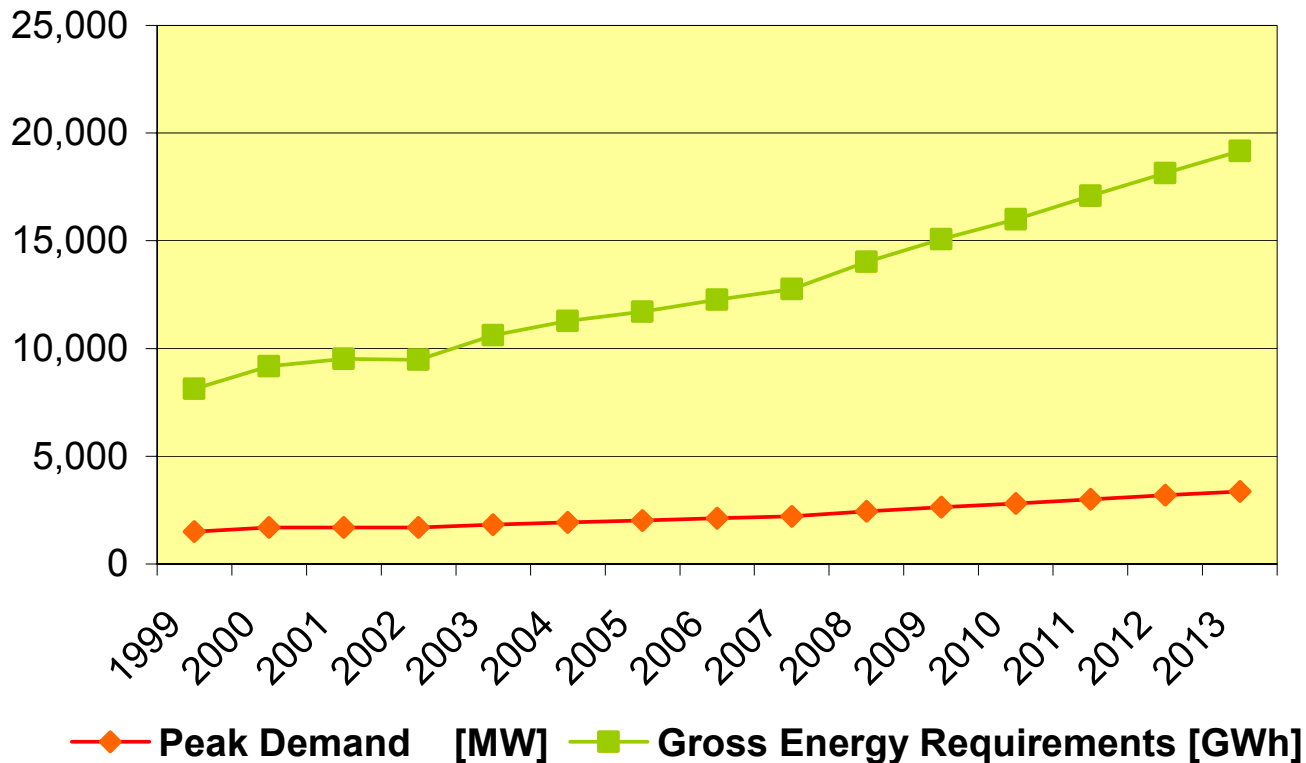
- SDG&E imports 60 percent of its electricity from outside the region
- Two existing power plants have a generating capacity of 2570 MWs
- Two new energy projects under construction in San Diego County
- IID net exporter of electricity

SDG&E Renewable Procurement Plan

Technology	2010			2014		
	MW	GWh	%	MW	GWh	%
Biogas	72	517	15%	66	466	10%
Biomass	120	930	26%	120	930	21%
Wind	379	1,181	34%	409	1,273	28%
Hydro	32	69	2%	37	80	2%
Solar	101	218	6%	106	228	5%
Geothermal	73	573	17%	194	1,519	34%
Total	777	3,488	100%	932	4,496	100%

Source: San Diego Gas & Electric Company, July 9, 2004, *Long-Term Resource Plan of San Diego Gas & Electric Company (U 902 E)*, direct testimony of Vincent D. Bartolomucci, California Public Utilities Commission, pp 11, 14.

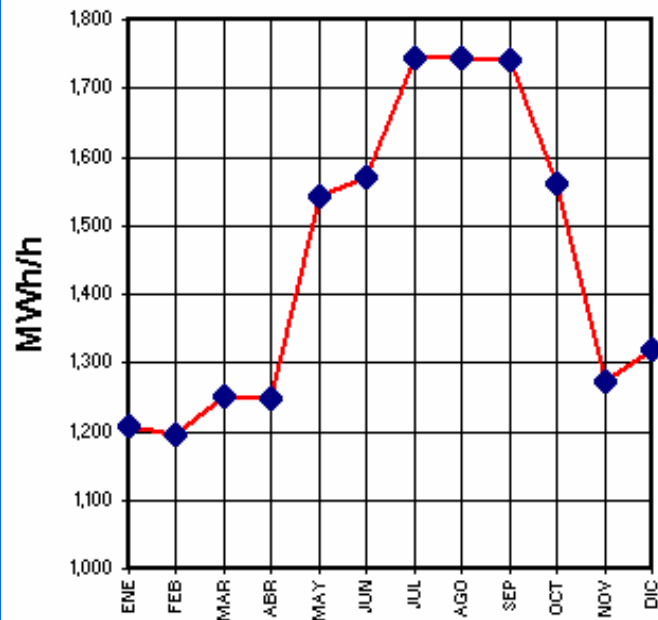
Peak Demand and Energy Baja California Norte



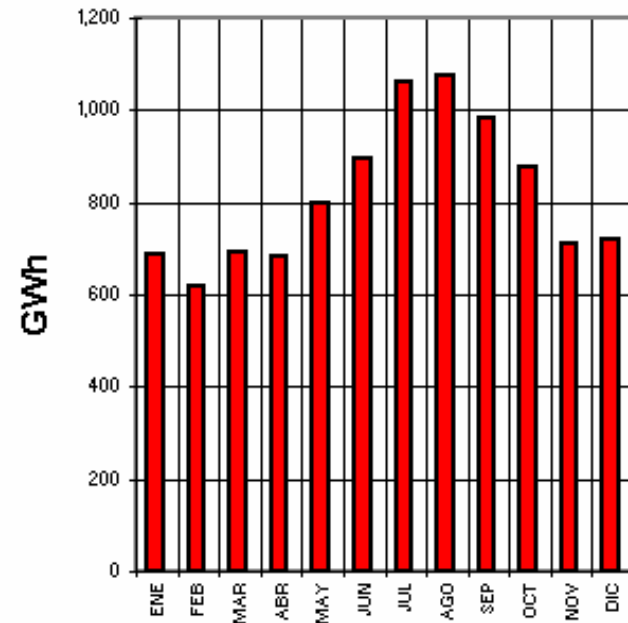
Source: Comisión Federal de Electricidad, Mexico, 2005, Programa de Obras e Inversiones del Sector Eléctrico 2004-2013, Tables 1.7 and 1.8.

Energy Load Pattern Baja California Norte (2003)

Peak Demand



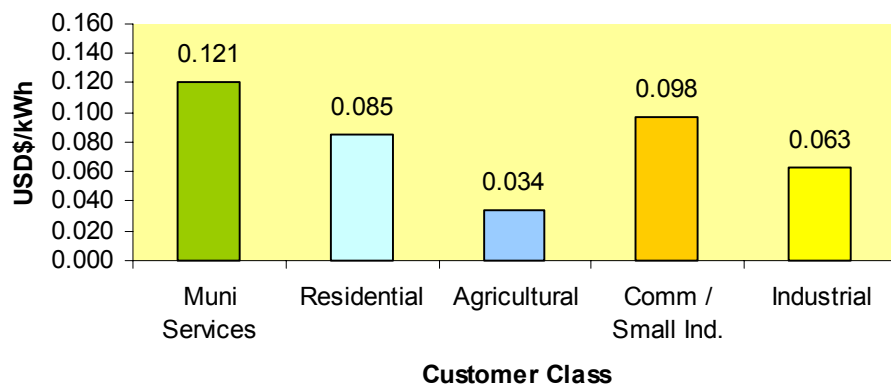
Energy Consumption



Source: CFE-CENACE – 2003 load data

Energy Sales by Customer Class

Average 2004 BCN Electricity Price

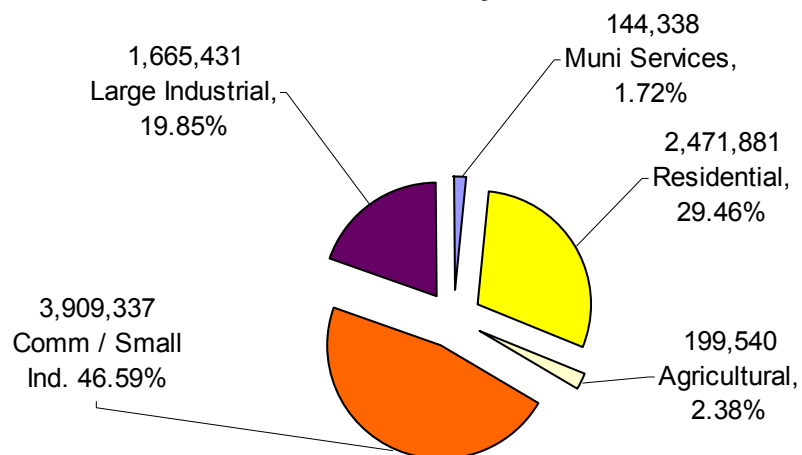


2004

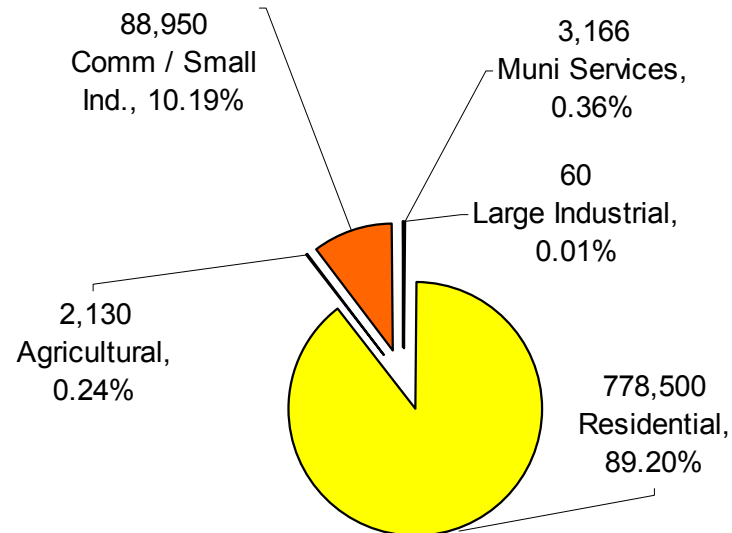
872,806 Electricity Consumers

Total Electricity Sales 8,390,527 MWh

**Electric Energy Sales - BCN
MWh/yr**



Number of Electricity Consumers - BCN



Energy Load Summary

Baja California (2004)

Peak Demand **1,940 MW**

Valley ~ Summer **1,100 MW**
Coastal ~ Winter **550 MW**

1993-2003 Historic Peak Growth **6.3%**
2004-2013 Forecast Peak Growth **6.3%**

Energy Sales **8,390,527 MWh**

1993-2003 Historic Ave. Growth **7.5%**
2004-2013 Forecast Ave. Growth **7.0%**

2002-2003 Actual Energy Growth **4.8%**
2003-2004 Actual Energy Growth **4.2%**

Electricity Supply/Demand Balance





Baja California Norte

	2005	2006	2007	2008	2009	2010	2011	2012	2013
In Operation									
Retirements									
Presidente Juarez					(150)				
Presidente Juarez							(150)		
New Entrants									
Baja California (Mexicali II) Rosarito				220					
Pte. Juarez GCT/CC Conversion						81			
Baja California II GCT (Ensenada)						247			
Baja California III (w/25MW SLRC)							245		
Baja California IV GCT (Tijuana)								247	
Baja California V (Mexicali) /1									242
Total Capacity	2,652	2,652	2,652	2,872	2,722	3,050	3,145	3,392	3,634
Gross Demand	2,024	2,125	2,217	2,443	2,635	2,805	3,008	3,190	3,373
Reserve Margin /2	31%	25%	20%	18%	3%	9%	5%	6%	8%

/1 Either new generating plant or PPA

/2 Minimum reserve margin for BC - after planed outages - the larger of: the largest gen unit or 15% of peak demand

Current Energy Efficiency Programs in Northern Baja California

 <p>ASI Programa de Ahorro Sistemático Integral FIPATERM</p>	<p>Residential building envelope efficiency improvements in Baja California are promoted and financed by FIPATERM, a trust fund established in 1990 in Mexicali, BC, to finance the insulation of roofs in existing high-demand (>1000 kWh/month) residential buildings. FIPATERM has financed the insulation of over 60,000 roofs. In 1996 the financing program was expanded to inefficient AC replacement and incandescent lamp substitution with CFLs. To date the program has replaced over 45,000 AC units and financed over 400,000 CFLs. In 2002 the financing was extended to refrigerator replacements. Over 5,000 EE refrigerators have been financed to date. Residents of Mexicali, San Luis Colorado and Tijuana (as well as the rest of Baja) are now eligible.</p>
 <p>FIDE</p>	<p>Commercial and industrial EE technical assistance and finance support activities in Baja California are the responsibility of FIDE, a trust fund established by the GOM to promote the efficient use of energy in the power sector. FIDE is funded by the private sector through a .2 percent surcharge to all purchases made by CFE. FIDE has recently started a energy efficiency financing program for small and medium enterprise (PyMEs) which has so far signed up 50 participants in Baja California (500 nationwide). The program currently focuses mainly on air conditioning. While FIDE doesn't lack funding - it submitted a budget request for almost 35 million USD in 2005- its program for small and medium enterprise lacks in outreach capacity.</p>
 <p>CFE Comisión Federal de Electricidad</p>	<p>CFE does not have EE beyond customer education programs. However, CFE customer representatives inform its customers of the availability of technical and financial assistance available through FIPATERM, FIDE and CONAE. In the area of demand management, CFE offers interruptible service tariffs to its large customers and direct AC cycling to its residential and small commercial customers.</p>
 <p>INFONAVIT FIDE</p>	<p>FIDE in cooperation with INFONAVIT, the Federal Government housing development authority, has recently offered a new residential construction pilot program through some of major residential developers in the Northern Baja California region. At present approximately <u>600</u> new EE homes are being offered in the Mexicali area by the participating builders.</p>

BCN Energy Efficiency Improvement Potential

Industrial	
Number of Manufacturing and Assembly Plants	641
Potential Electricity Savings (MWh/year)	172,772
Commercial (Hospitality)	
Number of Hotels	221
Potential Electricity Savings (MWh/year)	55,229
Institutional (Health, Gov., Educ.)	
Number of Facilities	440/?/1088
Potential Electricity Savings (MWh/year)	76,971/?/190,328
Potential Electricity Savings (MWh/year)	434,600

Total 2004 Comm/Ind/Instl Sales (MWh/year) 5,719,106

Source: Western Governors Association

Electricity Transmission Lines



Interregional Electricity Exchange Issues

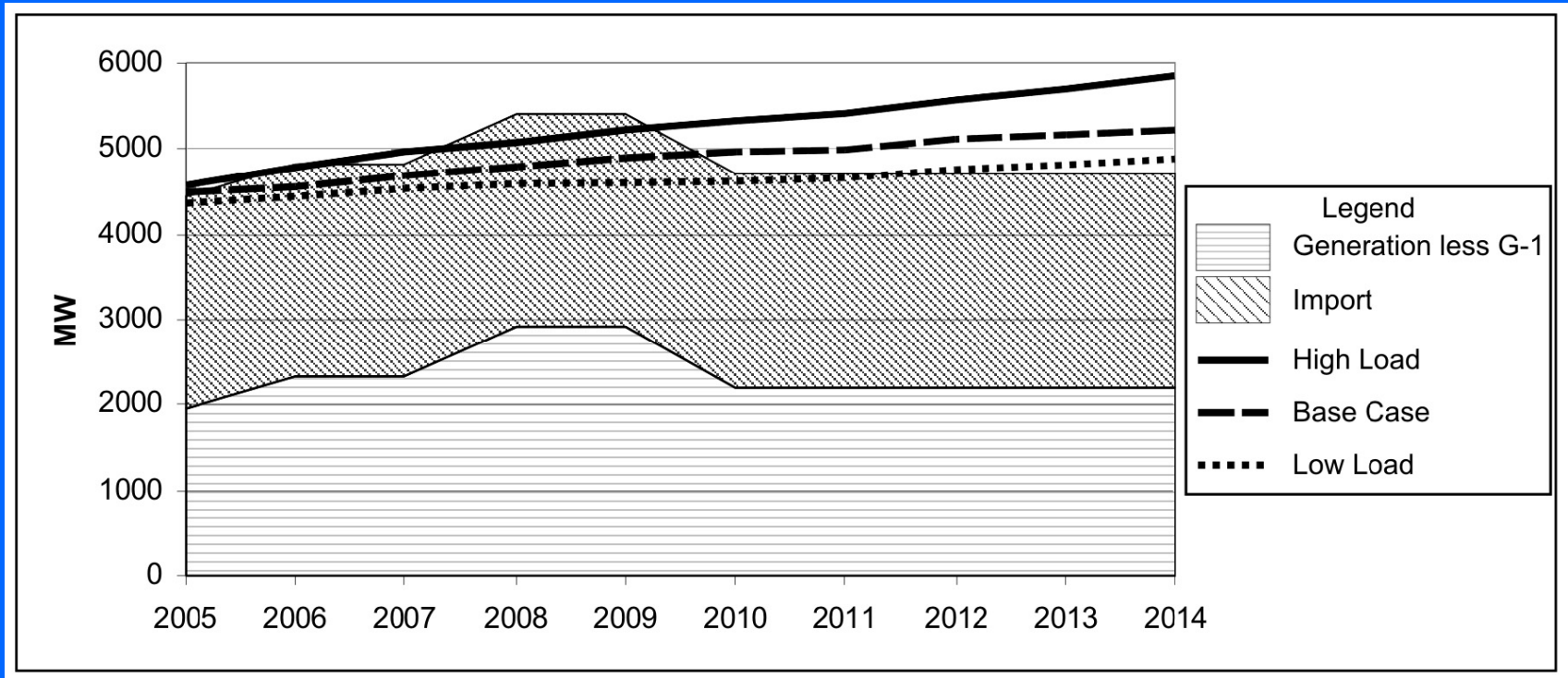
- SDG&E has historically relied upon significant quantities of imported electricity to meet its service area needs, but its transmission system has a simultaneous import capability limitation of 2,850 MW.
- Congestion around the Miguel Substation is caused by electricity flowing from new power plants just south of California's Imperial County border with Mexico.
- Current transmission lines are not large enough to deliver all the new power to areas that need it, such as the San Diego region.
- East-west transmission line constraints on both sides of the border may affect SDG&E's ability to utilize renewable resources.

Border Region Electric Transmission System



Source: San Diego Gas & Electric Company, October 1, 2004, *SDG&E's Comparison Study*, presentation to Stakeholder Meeting, p. 22.

SDG&E Grid Reliability Forecasts



Source: San Diego Gas & Electric Company, July 9, 2004, *Long-Term Resource Plan of San Diego Gas & Electric Company (U 902 E)*, California Public Utilities Commission, direct testimony of Linda P. Brown, p 10.

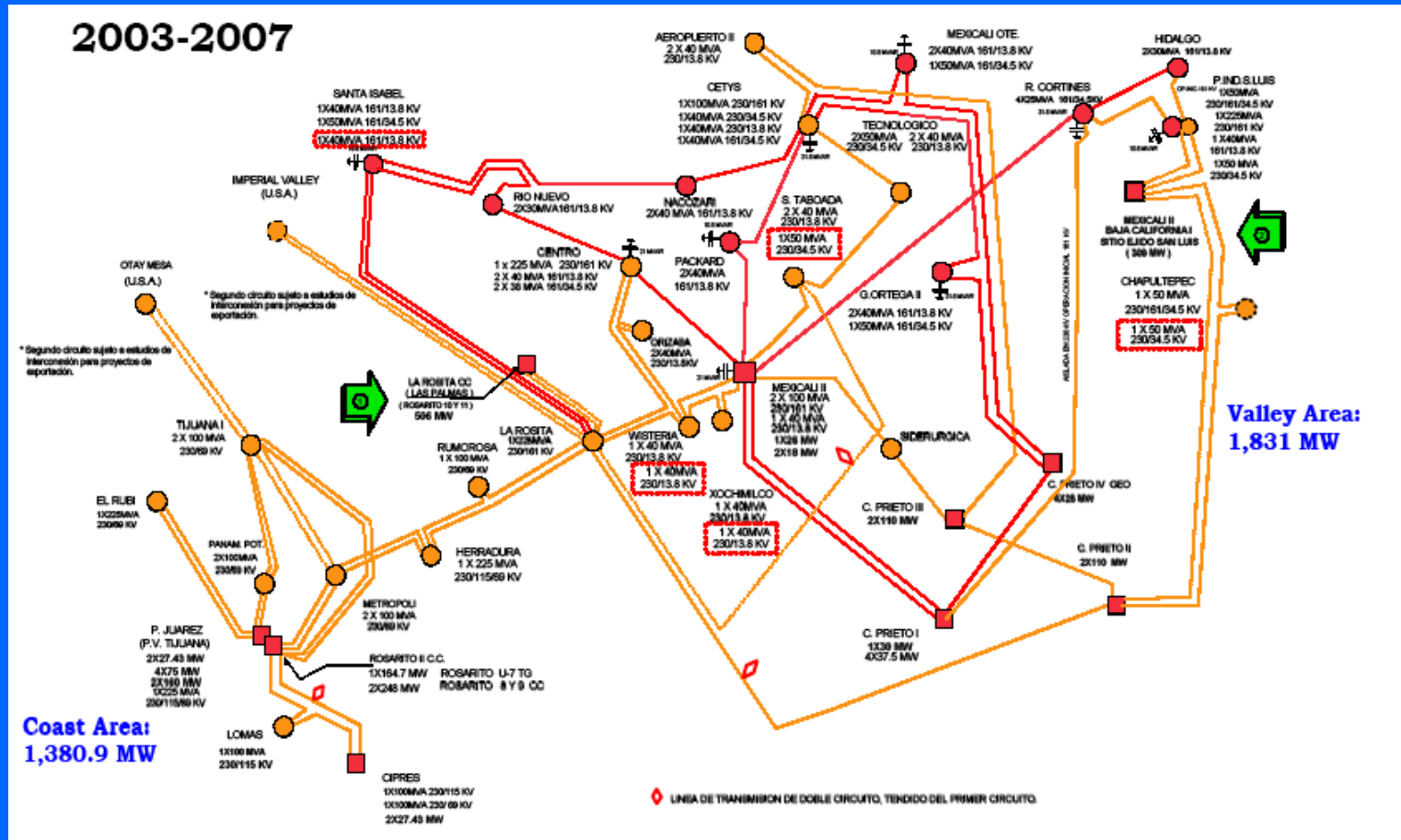
SDG&E's Long-Term Resource Plan

- Need for additional major transmission project
 - compliance with Cal-ISO grid planning criteria
 - displace existing high-cost reliability-must-run (RMR) generation
 - provide for the potential retirement of aging local units
 - deliver additional conventional and renewable generation at lower costs
 - increase supply diversity
 - replace a portion of the expiring California DWR contracts
- More reliance on renewable resources

Potential SDG&E Renewable Resources Sources

- Transmission line to the Salton Sea Geothermal Area in Imperial County
- Geothermal or wind power imported from northern Mexico

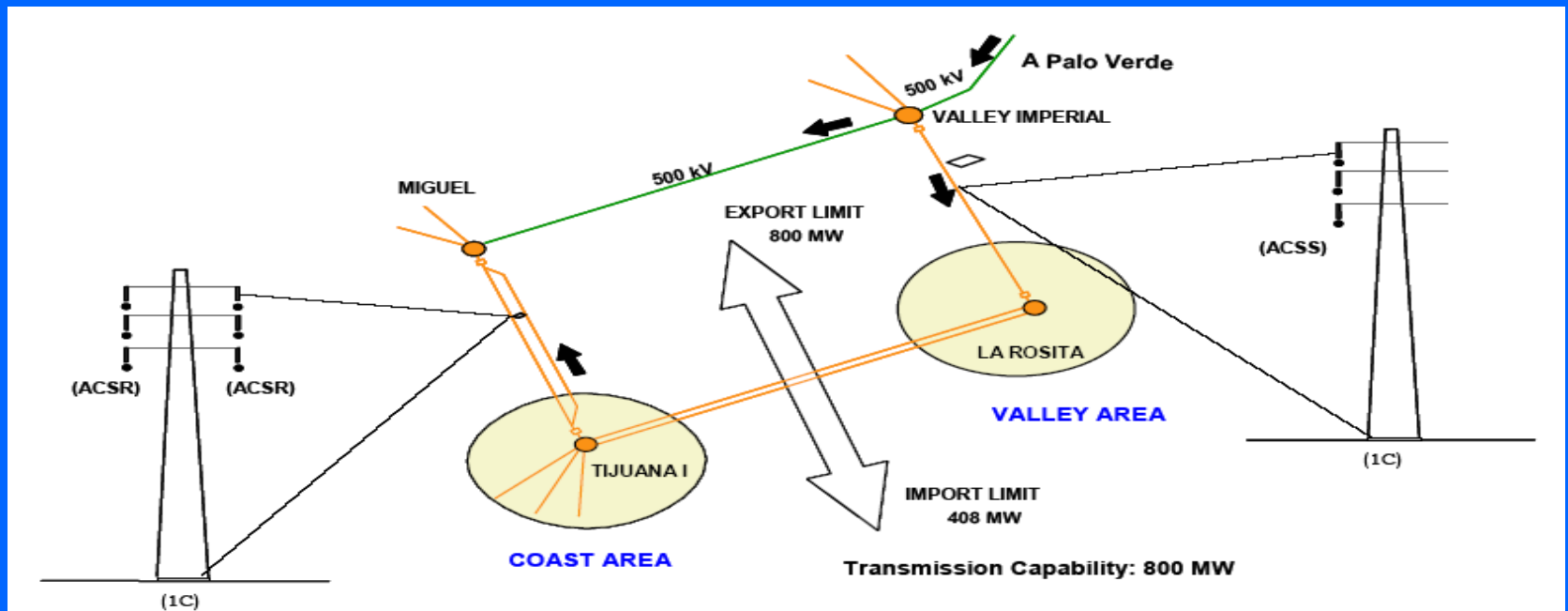
Transmission System Baja California Norte



Source: CFE Planning Subdirection

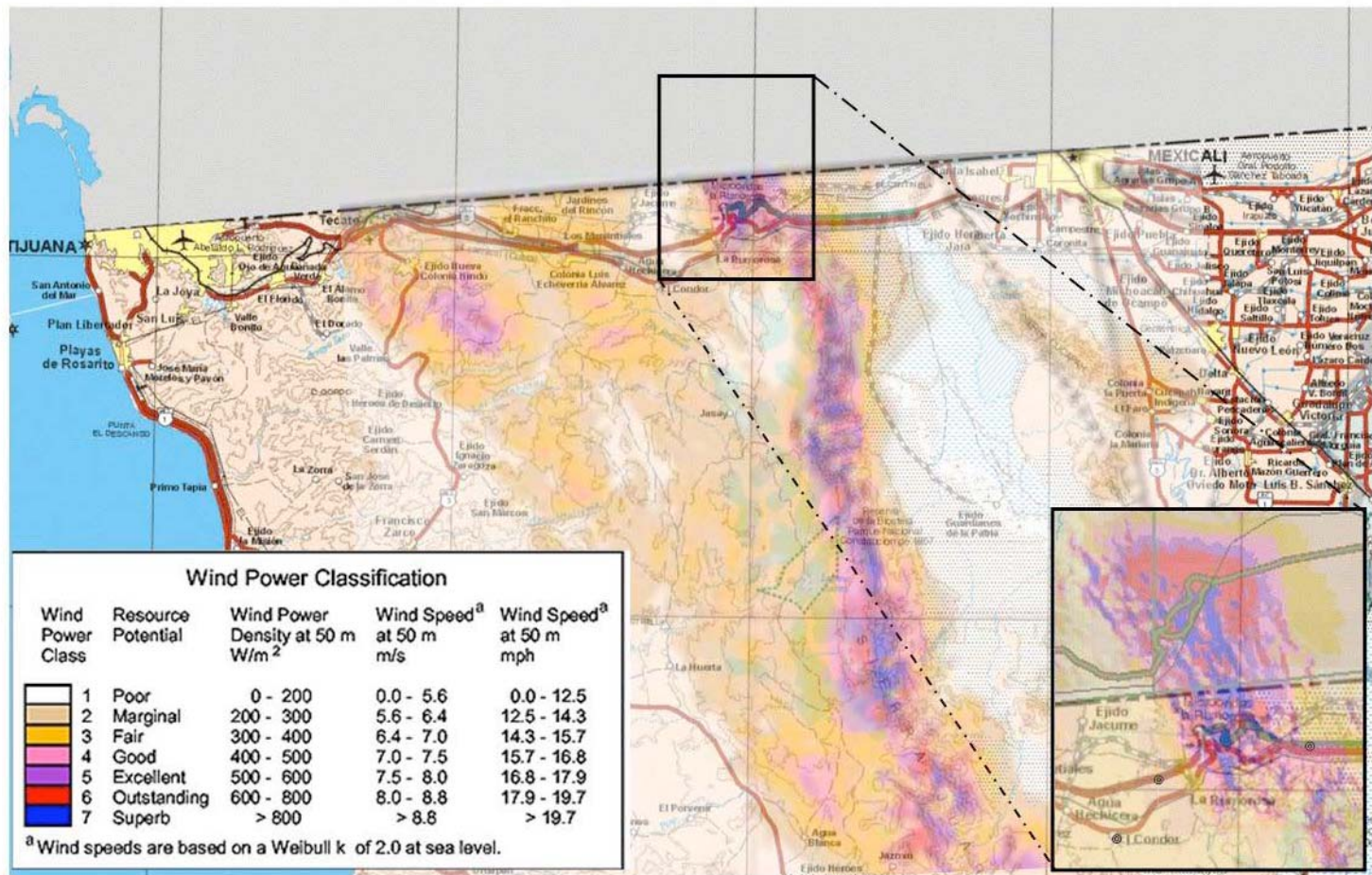
Cross-Border Electricity Exchange

	GWh											
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Mexico to California	2023	1995	1947	1920	1258	17	45	31	66	112	164	765
California to Mexico	24	44	166	228	355	406	480	646	927	82	311	45



Wind Power Densities at 50 meters

Baja California Norte



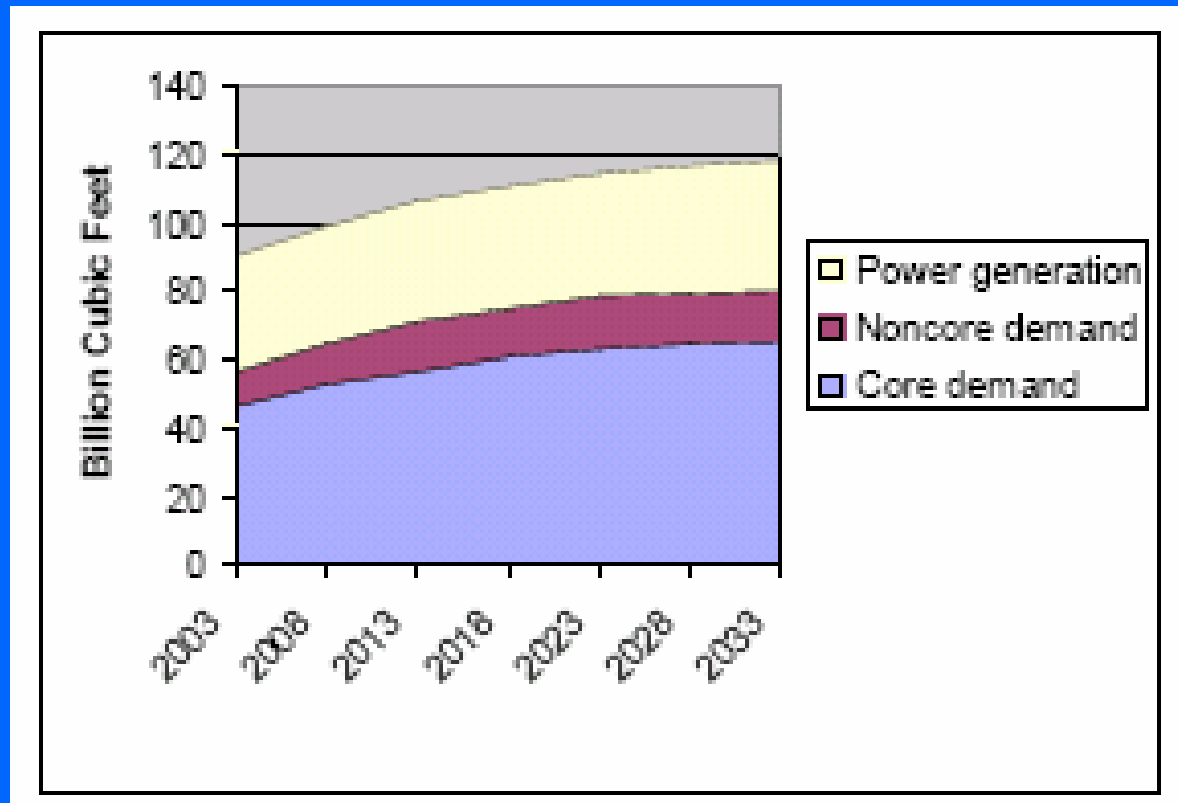
Natural Gas Infrastructure



Natural Gas Demand Growth

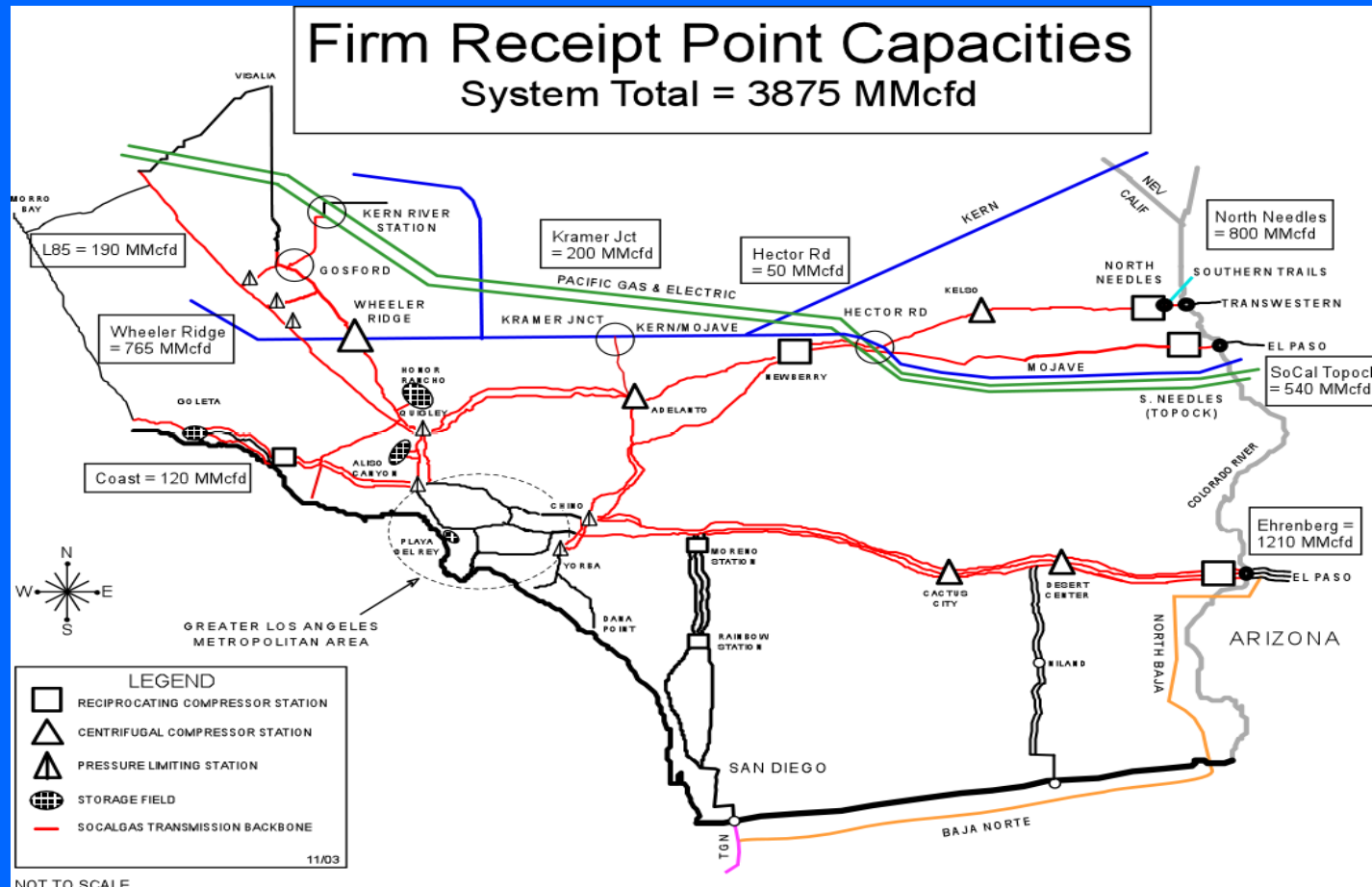
- SDG&E natural gas demand is forecast to grow between 1.2 and 1.6 percent annually, driven primarily in the near term by power plant demand
- Simultaneously, Baja California natural gas demand is projected to grow by as much as 7 percent annually, primarily for electricity generation and industrial heat

Natural Gas Demand Forecasts SDG&E (2003-2038)



Source: California Energy Commission, August 2003, *Natural Gas Market Assessment*, California Energy Commission, Sacramento, CA, Pub number, 100-03-006, Appendix C.

SoCalGas Natural Gas System



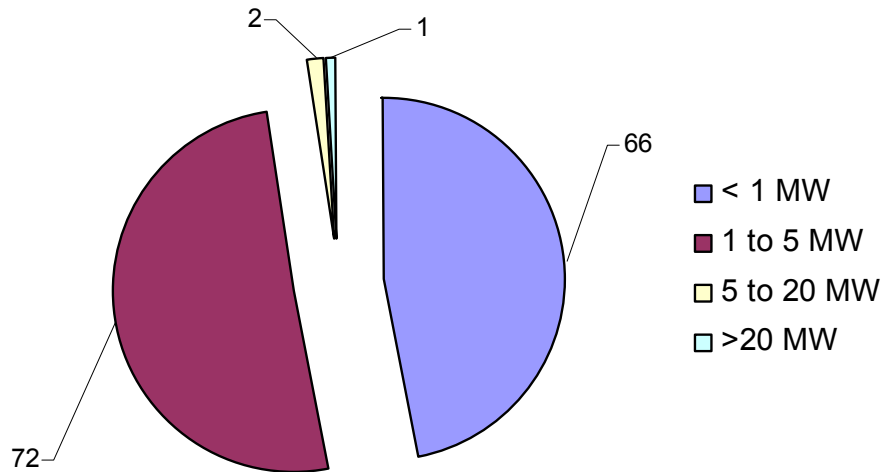
Source: San Diego Gas and Electric Co., November 2003, Responses to CPUC Data Requests, OIR to Establish Policies and Rules to Ensure Reliable, Long-Term Supplies of Natural Gas to California, R.04-01-025, Map Q.6.2.

Forecast Natural Gas Demand Baja California Norte (2003-2010)

Rosarito Load (CFE)	2003	2004	2005	2006	2007	2008	2009	2010
2x CC Units (496 MW) Units 7&8	53	62	62	65	66	66	68	68
2x Dual Units (320 MW) Units 5&6	24	13	53	55	56	56	58	58
Total Rosarito	77	75	115	121	122	122	126	126
MMCFD								
Mexicali Load	2003	2004	2005	2006	2007	2008	2009	2010
InterGen Azteca 500 MW CC for CFE	74	65	63.1	74.3	74.3	74.3	74.3	74.3
InterGen Azteca 290 MW CC for SoCal (Mexicali II in 2008)	na	19	19.4	25.4	27.9	30.4	43.1	43.1
InterGen Azteca 310 MW CT for SoCal (BC II in 2010)	na	na	2.0	3.8	11.3	15.0	15.0	15.0
Total InterGen Azteca	74	84	84.5	103.4	113.4	119.7	132.4	132.4
		72.0						
Sempra Termoelectrica de Mexicali (600 MW)	0	53	57.6	62.6	67.9	73.1	78.3	83.5
Mexicali LDC (DGNM)		11	11.0	11.5	11.9	12.4	12.9	13.4
Total Mexicali		148	153.2	177.5	193.2	205.2	223.6	229.4
Total Baja Demand		223	268.5	298.0	315.5	327.4	349.3	355.0

Combined Heat and Power Potential

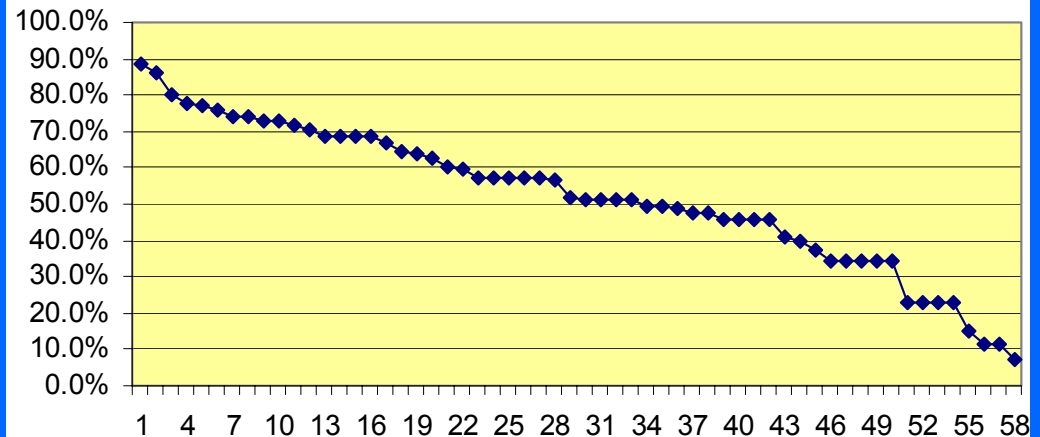
Distribution of the 141 Largest Tijuana Electricity Consumers by Peak Demand



- CHP potential is limited by access to natural gas
- Providing access to groups of industries may be an opportunity for new private pipeline developers

- Very limited field data available
- Needs further study

Baja California Norte Largest Electricity Consumers - Annual Load Factor



Baja California LNG Project Status



**CT Coronado LNG
project 700-1400
MMCFD faces env.
permit challenge.
Sched. Opn. 2007.**

**Moss Maritime 297 MMCFD
offshore LNG Project.
Modular and easily
expandable – EIS approved
Needs CRE permit.
Op. Start. 2008**

**The 1000 MMCFD
SS Costa Azul LNG
project is progressing,
and could double
capacity in a second
phase – Op. Start 2008**

Natural Gas Pipeline System Baja California



Cross-Border Natural Gas Issues

- Significant pipeline infrastructure has been added in Baja California to bring U.S. natural gas supplies to the region.
- Several LNG projects have been proposed in Baja California that could also supply gas to meet demand on both sides of the border.
- The ability to import potential new supplies of natural gas from LNG facilities in Baja California to California is constrained by the capacities of the SoCalGas and SDG&E gas transmission systems.
- Importation of LNG from Mexico to SoCalGas would require improvements to the SDG&E system to reverse the flow of gas and expand its capacity.